CCM 1000

Unidirectional optical and digital contact closure multiplexer system

USER MANUAL

1. General description

The CCM 1000 contact closure multiplexer system can transmit eight independent contact closure signals unidirectionally over either one optical fibre or a serial data link (RS-232). A CCM 1010 TX/RX combination uses an optical wavelength of 850 nm over multimode fibre, while a CCM 1050 transmits with 1310 nm through single-mode fibre.

Front panel LEDS indicate DC power good, correct transmission framing and correct receiver synchronization.

CCM 1000 equipment comes in the form of rack-mountable 7TE modules to be slotted into an Optelecom-NKF MC 11 or similar power supply cabinet, or as stand-alone units (option /SA) needing separate power supplies PSA 12 DC.

2. Indications and connectors

The CCM's front panel indications and connectors are listed in table 1 below.

CCM TX	
(optical connector)	optical out
8xCC (37-pin conn.)	CC inputs, data out
Indicator LEDs	
***DC**	DC power good
***FR**	signal framing OK
CCM RX	
(optical connector)	optical in
8xCC (37-pin conn.)	CC outputs, data in
Indicator LEDs	
***DC**	DC power good
***SYNC**	input signal sync OK

Table 1. CCM front panel features

3. Installation instructions

3.1 General

- Insert the units into an appropriate MC 11 or similar power supply cabinet (and/or connect stand-alone units to their power supplies) and connect appropriate cabling. Pin assignments are listed in section 5.

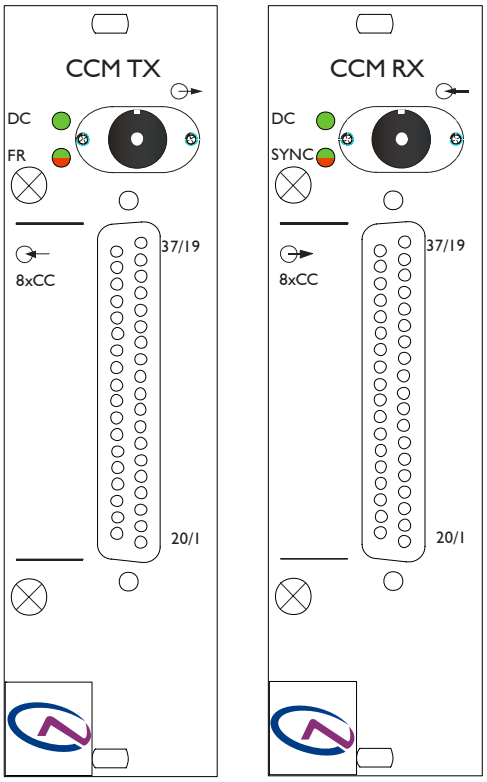

Figure 1. Front panel features of the CCM 1000 TX (left) and RX

- After switching on the system, check whether all LEDs glow green. If the FR LED on the CCM TX is red, that unit is faulty. If the SYNC LED on the RX lights red while the FR LED glows green, please check the optical link first.

3.2 Link type

The unit will try to establish and use a link type based on link input measurements (default autodetect mode; it will hold on to an interface as long as signal is present). To permanently select either the optical or the RS-232 link, internal dip switches can be set.
To access these switches, take out the front panel Phillips head screws indicated in figure 1 and slide out the front panel/circuit board assembly. Dip switches S1/S2 select between autodetect, the serial link and the optical link (see figure 2 and table 2).

S2	S1	function
OFF	OFF	autodetect (default)
OFF	ON	optical
ON	OFF	RS-232
ON	ON	optical

Table 2. Dip switch settings for link type selection

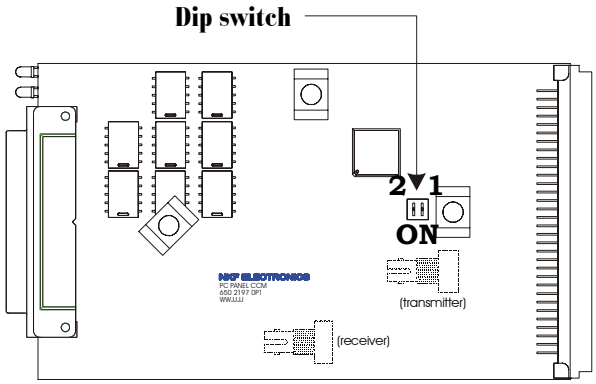

Figure 2. CCM TX/RX circuit board with dip switch. for link type selection (see text).

4. Care and maintenance

In order to maintain reliable operation of the system, please observe the following precautions:

- prevent dust from collecting on the equipment
- protect the equipment against moisture
- maintain sufficient free space around the equipment for cooling.

General safety and EMC information will be found in the final section of this document.

5. Pin assignments of the 37-pin connector

CCM 1000 D-37 connector pin assignments are listed in table 3 below, combined for TX and RX units; they are rendered graphically in figure 3.

Pin no.	Assignment	Pin no.	Assignment
1	CC1 in	20	GND
2	CC2 in	21	GND
3	CC3 in	22	GND
4	CC4 in	23	GND
5	CC5 in	24	GND
6	CC6 in	25	GND
7	CC7 in	26	GND
8	CC8 in	27	GND
9	RS-232 out (CCM TX)	28	RS-232 in (CCM RX)
10	GND	29	GND
11	CC8 out A	30	CC8 out B
12	CC7 out A	31	CC7 out B
13	CC6 out A	32	CC6 out B
14	CC5 out A	33	CC5 out B
15	CC4 out A	34	CC4 out B
16	CC3 out A	35	CC3 out B
17	CC2 out A	36	CC2 out B
18	CC1 out A	37	CC1 out B
19	not used		

Table 3. D37 pin assignments of CCM 1000 TX (pins 1-9) and RX (pins 11-37). GND pins are the same for both.

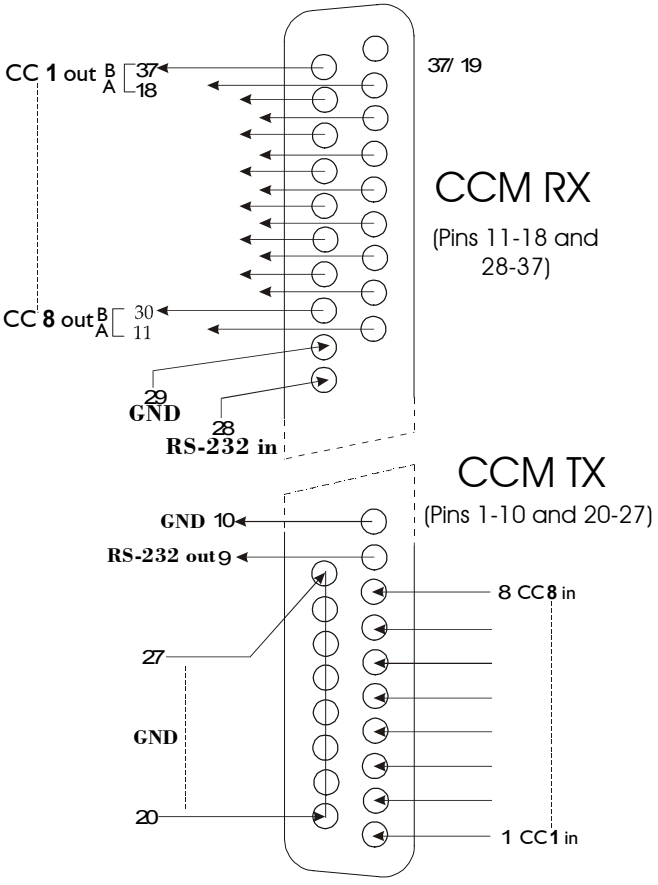

Figure 3. CCM 1000 RX (top) and TX (bottom) pin assignments. GND pins indicated are on both units.

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6. Technical specifications

The technical specifications of the CCM 1000 system are listed in table 4 below.

Feature	Value		Unit
System I/O			
Contact closure I/O			
Number of channels	8		
Input	+5 V pull-up, 10 kΩ		
Input sink (max)	2.5		mA
Activation threshold	0.75 (<1.5 kΩ)		V
Output (potent.-free)	normally open, fail-safe		
Output switch rating	2 A @ 30 V_{DC} (per switch)		
System response time	<2		ms
Interface detect poll	400		ms
Optical	CCM 1010	CCM 1050	
Wavelength	850	1310	nm
Fibre type	multimode (50/62.5)	single-mode	
TX output power	-21	-10	dBm
RX min. input power	-45	-45	dBm
System budget	≥ 28 (23)[1)]	≥ 35 dB	
Electrical			
Data link interface	RS 232		
Data rate	20k		bit/s
Management			
LED status indicators			
*DC	power-on indication (green)		
(TX) *FR	framing okay		
(RX) *SYNC	input synchronised		
Environmental and Safety			
Operating temp. range	-40 to 74		°C
Relative humidity	<95 (no condensation)		%
Sinusoidal vibration	IEC69-2-6, Test Fc: 10-100Hz@9.8m/s^2		
Drop and topple	IEC68-2-31, Test Ec		
Electrical safety	AL / IEC / EN 60950-1		
UL recognition file	E242498		
Laser safety	IEC 60825-1, IEC 60825-2		
EMC immunity	EN 55024, EN 50130-4, EN 61000-6-2		
EMC emission	EN 55022 (Class B) FCC 47 CFR 15 (Class B)		
Electrical			
Supply voltages	+&-12 (±10%)		V_{DC}
Power consumption	TX: 1.1 ; RX: 1.2		W
Mechanical			
Optical connector	ST	FC (others on request)	
I/O connector	D37, female		
Serial connector	2 (TX), 2 (RX) pins on D37		
Housing	Eurocassette or SA		

Table 4. CCM 1000 technical specifications

[1)] Into 50/125µ fibre

7. Safety, EMC, ESD

General

The safety information contained in this section, and on other pages of this manual, must be observed whenever this unit is operated, serviced, or repaired. Failure to comply with any precaution, warning, or instruction noted in the manual is in violation of the standards of design, manufacture, and intended use of the unit.

Installation, adjustment, maintenance and repair of this equipment are to be performed by trained personnel aware of the hazards involved. For correct and safe use of the equipment and in order to keep the equipment in a safe condition, it is essential that both operating and servicing personnel follow standard safety procedures in addition to the safety precautions and warnings specified in this manual, and that this unit be installed in locations accessible to trained service personnel only.

Optelecom-NKF assumes no liability for the customer's failure to comply with any of these safety requirements.

UL/IEC/EN 60950-1: General safety requirements

The equipment described in this manual has been designed and tested according to the UL/IEC/EN 60950-1 safety requirements.

If there is any doubt regarding the safety of the equipment, do not put it into operation. This might be the case when the equipment shows physical damage or is stressed beyond tolerable limits (e.g. during storage and transportation).

Before opening the equipment, disconnect it from all power sources. The equipment must be powered by a SELV*) power supply.

When this unit is operated in extremely elevated temperature conditions, it is possible for internal and external metal surfaces to become extremely hot.

Optical safety

This optical equipment contains Class 1M lasers or LEDs and has been designed and tested to meet IEC 60825-1:1993+A1+A2 and IEC 60825-2:2004 safety class 1M requirements.

Optical equipment presents potential hazards to testing and servicing personnel owing to high levels of optical radiation. When using magnifying optical instruments, avoid looking directly into the output of an operating transmitter or into the end of a fibre connected to an operating transmitter, or there will be a risk of permanent eye damage**.** Precautions should be taken to prevent exposure to optical radiation when the unit is removed from its enclosure or when the fiber is disconnected from the unit. The optical radiation is invisible to the eye.

Use of controls or adjustments or procedures other than those specified herein may result in hazardous radiation exposure.

The installer is responsible for ensuring that the label depicted below (background: yellow; border and text: black) is present in the restricted locations where this equipment is installed.

The locations of all optical connections are listed in the Indications and Connectors section of this manual.

Optical outputs and wavelengths are listed in the Technical Specifications section of this manual.

EMC

The equipment has been tested and found to meet the CE-regulations relating to EMC, and complies with the limits for a Class B device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against interference to radio communications in any installation. The equipment generates, uses and can radiate radio frequency energy; improper use or special circumstances may cause interference to other equipment or a performance decrease due to interference radiated by other equipment. In such cases, the user will have to take appropriate measures to reduce such interactions between this and other equipment.

Any interruption of the shielding inside or outside the equipment could cause the equipment to be more prone to fail EMC requirements.

Non-video signal lines must use appropriate shielded CAT5 cabling (S-FTP), or at least an equivalent.

If system components, such as cabling (e.g. coaxial cable, data/audio/cc wiring) and/or the units, are used outdoors, ensure that ***all*** electrically connected components are carefully earthed and protected against surges (high voltage transients caused by switching or lightning).

ESD

Electrostatic discharge (ESD) can damage or destroy electronic components. Proper precautions should be taken against ESD when opening the equipment.

*) SELV: conforming to IEC 60950-1, <60V_{DC} output, output voltage galvanically isolated from mains. All power supplies or power supply cabinets available from Optelecom-NKF comply with these SELV requirements.

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